Application for an exempted fishing permit to use electronic monitoring to confirm that at-sea discards are done according to a monitoring protocol and for estimating the weight of halibut discards

Applicant: Alaska Groundfish Databank
P.O. Box 788
Kodiak, AK 99615
Tel: 907-486-3033

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Purpose and Need: Later this year, the management of the rockfish fishery in the Central Gulf of Alaska will shift from open access to fishing cooperatives. Under the new Rockfish Pilot Program (RPP), fishing cooperatives will track individual allocations of target and bycatch species and NMFS will oversee program management and allocations as appropriate. In its implementation of the new program, NMFS has indicated that observer coverage will be increased from 30% to 100% for participating shoreside rockfish catcher vessels. An issue for RPP participants is the cost increase for observer coverage relative to the expected increase in revenues from the rockfish fishery and concerns over the accuracy of halibut bycatch amounts based on present North Pacific Observer Program sampling methods which were not designed for estimating haul-specific catches on individual vessels.

Cost Considerations for Observer Coverage in the RPP: Economies of scale for observing catches at-sea on Gulf rockfish trawlers are difficult to achieve. This is due to the relatively low catch volumes on these 60-100 foot catcher vessels relative to larger Bering Sea catcher boats and at-sea processors. To keep monitoring costs at a reasonable fraction of vessel revenues, one approach might be to rely on shoreside catch accounting in conjunction with at-sea monitoring technology to replace some of the monitoring duties that currently are assigned to observers. For rockfish fishermen, sampling catches at shoreside locations also makes sense for increasing safety by reducing the number of observer days on small boats.

Information on the relative costs of the current observer coverage requirements for GOA shoreside trawlers is available. The EA/RIR for Amendment 76 (Extension or Modification of the Program for Observer Procurement and Deployment in the North Pacific) reports that the GOA non-AFA CV trawlers in recent years have paid an average of approximately 2.3% of annual ex-vessel revenue for observer coverage (June 2006 public review draft; Table 5-7, page 196). The EA/RIR also documents that status quo observer costs for Gulf trawlers are relatively high at the 30% coverage level compared to other sectors of the trawl fishery.

Once observer coverage is increased to 100%, observer costs relative to revenues from fishing rockfish can be expected to be approximately three-fold higher (roughly 7%). The RPP may offer some savings in fishing costs and/or higher fish prices to help compensate for the increase in the cost of observer coverage. In the short run, however, fishermen do not expect efficiency or price gains to compensate for the large increase in observer costs relative to rockfish revenues. For this reason, fishery participants are

interested in exploring alternative, potentially lower-cost means of at-sea monitoring and collection of the necessary catch information.

For the west coast domestic whiting fishery and several west coast of Canada fisheries, shoreside sampling is currently in use as the primary mode of fishery data collection. Electronic monitoring (EM) is used on fishing vessels in those programs to help ensure that discards at sea do not occur. For the Rockfish Pilot Program, a similar application may be possible where reliance on sampling at the shoreside plants occurs and EM is used to monitor at-sea discards. In the case of the RPP, however, EM would be used to verify that required procedures for discarding at sea are followed and to account for the allowable discards in the manner that will be detailed below. This EFP application is being prepared in support of the necessary research to evaluate how at-sea discards of halibut could be accounted for with EM and the accuracy of EM accounting versus present methods.

The opportunity to use EM for fishery monitoring in the RPP:
Rockfish fishing for the major target species in the Central Gulf of Alaska (Pacific Ocean Perch, northern rockfish, and pelagic shelf rockfish) is relatively selective in terms of the percentage of the catch that is rockfish and high retention rates relative to flatfish and other GOA target fisheries. Selective fisheries where a high fraction of the catch is retained are logical candidates for reliance on shoreside sampling as the primary fishery data collection point and EM to monitor and account for at-sea discards.

In 2005, a pilot study was conducted to evaluate the use of EM to monitor discards in the Central Gulf of Alaska rockfish fishery (McElderry et al. 2005). The study evaluated the utility of EM video data obtained from camera placements to observe fish sorting and handling across the entire trawl deck. One key conclusion of the 2005 GOA EM pilot study was that the feasibility of using EM, including the practicality of reviewing the video data, is higher where discard volumes are relatively low. Another conclusion was that if discarding is done from multiple locations on the vessel deck (e.g. port and starboard scuppers, trawl ramp, and over the gunnels) some discrepancies between observer tallies of discards and estimates from EM can be expected.

Additionally, cameras used in the 2005 pilot study to observe the entire deck area posed some problems for exact classification of the fish being discarded. For fish with similar appearance (e.g. species in the flatfish and rockfish families respectively), fish identification was only possible to the family level rather than to specific species. Overall, however, the study concluded that EM can be very useful for accomplishing some of the monitoring duties needed for the Gulf of Alaska rockfish fishery. To this end, the report stressed that a logical way to make EM more effective would be to restrict discard locations to one or two locations where specific camera placements could be used to improve the ability to distinguish between species being discarded.

This exempted fishing permit (EFP) application seeks to build upon the potential for EM described in the 2005 EM pilot by incorporating the single point of discard approach. Additionally, we are interested in extending the application of EM beyond general monitoring of discards to estimating actual amounts of halibut discard via EM. Estimating discards of certain allowable discard species is important because the monitoring issue for the RPP adds an additional layer of complexity for at-sea monitoring. Halibut will remain a prohibited species in the RPP that fishermen are required to discard at sea. The ability of individual cooperatives to harvest their rockfish

allocations may be directly affected by their ability to stay within the halibut bycatch limitations allocated to their cooperative. So accurate monitoring of halibut discards at sea will be a key issue for the Rockfish Pilot Program and hence a major area of focus for this EFP.

For our EFP test, halibut will be the only species allowed to be discarded at sea. Further, discarding will only be allowed via a single, specially designed discard chute. This EFP discard chute will be equipped with camera placement(s) for the purpose of obtaining length data for individual discarded fish. In addition, other modifications to the discard chute will be made to allow a census of discarded halibut to be obtained after discarding is completed. If successful and feasible, catch accounting data could thus be obtained shoreside when catches are delivered to shoreside plants and halibut discards at-sea could be estimated through this specialized application of EM.

Given the different procedures for handling and sampling fish needed for our research on EM, an EFP is necessary to allow us to depart from the normal requirements for catch handling and observer sampling. To support our research, an allocation of rockfish and associated bycatch species outside the regular rockfish fishery TAC and PSC limits is also needed. Groundfish and halibut amounts required for our research are listed in the table below. These expected catch amounts are based on making 30 tows in the rockfish target fishery with an average of 30,000 pounds (13.6 metric tons) of total groundfish catch per tow. Observer data for non-pelagic trips with greater than 50% rockfish from 2003-2006 were used to estimate the expected EFP catches in the table below (data obtained from Josh Keaton, NMFS AK Regional Office).

Species	EXPECTED LB	EXPECTED MT
ARROWTOOTH	74,292	34
HALIBUT	18,475	8
NORTHERN ROCK	194,379	88
PACIFIC COD	92,396	42
PEL SHELF ROCK	115,313	52
PAC OCEAN PERCH	320,341	145
SABLEFISH	56,388	26
SORTRAKER/ROUGHEYE	1,811	1
THORNYHEADS	8,063	4
Other	18,475	8
Total	899,934	408

This EFP application is being developed in conjunction with the NMFS Alaska Region and Alaska Fishery Science Center. NMFS will also be directly involved with the field work and other aspects of the data collections, data review, and draft and final analysis and report writing. Exempted fishing permits are specifically intended for cases where exemptions to the ordinary practices and regulations are required to evaluate alternative management for a fishery.

Specific goals for our study are thus:

1. Assess the haul level accuracy and precision of estimates of the **number** and **weight** of halibut discarded (using published tables of length/weight regression) on a trawl vessel based on data from EM and standard observer sampling using a complete census of halibut in each haul as a known standard reference. This

assessment will include appropriate statistical tests of whether there are differences between the estimates and the known haul amounts.

2. Assess the extent to which error in the EM estimates of number and length of halibut is a function of the equipment and its placement, pace of discards and liveliness (viability) of halibut passing by the cameras, ambient conditions affecting the ability of cameras to obtain length data on halibut, technique used for reviewing EM data (including individual reviewer bias), and other important factors associated with estimating halibut discards with EM as detailed below.
3. Assess the costs associated with collecting and reviewing EM data.

If successful in terms of monitoring objectives and eventually cost effectiveness, EM may be able to assume some of the catch monitoring duties currently done by observers. To this end, we are specifically interested in evaluating EM for determining that at-sea discarding occurs in conformance with an established protocol described below and for estimating haul by haul discard weights of halibut. Although this EFP is focused mainly on assessing whether EM can be used to accomplish specific monitoring objectives for the RPP, the research will be useful for a preliminary assessment of some aspects of the cost effectiveness of EM.

Beyond a basic assessment of whether EM can assume some monitoring duties that have traditionally been assigned to observers, a thorough consideration of EM involves evaluation of tradeoffs in precision of EM for monitoring and discard estimation versus the methods currently used by observers. This EFP will also explore aspects of costs of EM for discard monitoring and estimation. A full assessment of these cost/feasibility issues would involve evaluating costs at the scale of a fishery-wide application of EM. Unit costs would be expected to be lower at a fishery-side application. For this reason, this EFP will not explore those bigger picture cost of a fishery-wide application, but will provide some of the information relative to unit costs of EM should EM prove capable of meeting the monitoring objectives. Thus our EFP research should help inform some aspects of the consideration of the cost effectiveness of EM monitoring for the RPP.

Methods:

The EFP study will utilize one fishing vessel and will start sometime between mid-September and the end of October, 2007. The vessel will be based in Kodiak during the experimental fishery and will make multiple trips each lasting two to three days including travel time. Two to five hauls per day will be made depending on the time needed for sorting and discarding activities as well as associated monitoring and catch sampling. The EFP vessel will be typical of the CGOA catcher vessels used for rockfish fishing with certain specific additional requirements for the testing of EM.

The process for selecting a vessel for the EFP will be done through an RFP process conducted by the EFP applicant in conjunction with the NMFS Regional Office and Fishery Monitoring and Analysis Division (a.k.a Observer Program) personnel involved with the EFP. In addition to the overall suitability of the vessel for the EFP research, a second requirement will be that the EFP vessel has sufficient beam and room between the trawl alley and the mid-ship scuppers to allow for the installation of a holding pen for "discarded" halibut. This area will be modified to function as a "pre-discard chute" (PDC) passageway designed to simulate normal discarding procedures on most shoreside rockfish trawl vessels. The additional beam and room between the trawl alley and the

discard chute are needed to simulate the amount of space available for sorting and discarding on a typical GOA rockfish trawler after the PDC modification to that portion of the vessel is made. Once the vessel has been selected, the information will be transmitted to NMFS so that the EFP can be issued.

With the exception of halibut, all fish caught during the EFP will be retained. The pre-discard chute will be installed on the EFP vessel prior to the fieldwork. Halibut will be sorted and then "discarded" by vessel crew through a single chute between the trawl alley and the vessel bulwarks. The PDC will mimic the actual mid-ship discard scupper on a Gulf trawler but instead of leading overboard, the chute will discharge into an area where halibut are retained prior to discard. This will allow project personnel to count and measure (weigh, if possible) each halibut or conduct a partial census in the (unlikely) event that too many halibut are caught on a given tow, making handling time for a census impractical. The PDC will be marked with length lines to assist the EM data reviewer in estimating the length of each halibut.

There will be two sea samplers working on the vessel during the EFP. Sea samplers will be trained NMFS observers not currently briefed for observer deployment. One project manager (may be hired by EFP applicant or be NMFS staff) will be on the vessel to oversee the research during the EFP. One sea sampler will concentrate on obtaining the census of bycatch while the other will conduct standard observer sampling duties. In the absence of a flow-scale or large checker bins, this will entail taking several (3 to 6) small samples (50 to 100 kg) from each haul. There are two additional sampling requirements (outside of standard observer duties). First, both sea samplers will be instructed to be vigilant about noting any discards that do not pass through the designated discard chute. Second, the sea sampler who will be using the normal observer sampling methods and must record each sample taken from each haul separately so that each unique sample can be identified in the datasets.

Once the sea sampler has completed sampling, the vessel crew will discard the halibut through the PDC. It will be important for the sea samplers to record whether any halibut are discarded through any routes other than the discard chute. This information will be used later to compare to video observations of the overall deck area and a specific camera arrangement to evaluate discards at the PDC. If unobserved halibut are discarded before being included in the census the results of the study would be compromised. Likewise, it will be important that all halibut data (counts, lengths, etc.) be associated with a specific haul. The successful removal of all the halibut from the catch by the vessel crew prior to dumping it into the vessel's RSW tanks will be critical to the success of the analysis of video and sampling data on a tow by tow basis. In both these cases, our ability to determine whether any detected differences between the census amounts and the estimated amounts of halibut discard (EM or sea sampler) are due to sampling issues or experimental protocol issues will be compromised if catch handling and sorting are not performed correctly.

Data from observer sampling will be expanded for each haul using the normal methodology to estimate overall halibut catch (and variance) per haul.

EM camera placements on the EFP vessel will be designed to verify that discards are done in a manner consistent with the specific protocol for our EFP (single point of discard and only discards of halibut allowed). Camera placements at the discard chute will be specifically designed for obtaining lengths of halibut. Prior to the testing, the EFP vessel deck will also be fitted with the EM cameras for the two monitoring objectives of our study. As sorting and discarding of halibut is occurring during the EFP, an EM

system designed to monitor discards anywhere on the vessel will be used to determine that all discards occurred at the prescribed discard location. The higher resolution cameras used for evaluating halibut discards at the allowed point of discard (PDC arrangement) will be used to confirm that discards were comprised entirely of halibut and for estimating the length of individual halibut.

The EM system used for the EFP will also be equipped with a GPS to determine the time and location of fishing/sorting activities, and hydraulic pressure sensors to determine when the hydraulics are engaged (presumably when net deployment/haulback is taking place). Note that deck cameras may also detect net deployment and haulback events.

In addition to the specific monitoring objectives described above, we also want to make a general assessment during the EFP of the feasibility of a restricting all discards to a single location on a typical rockfish catcher vessel during rockfish fishing. In discussions with fishery participants who are interested in our evaluation of EM for monitoring rockfish fishing, we have learned that most believe that a single point of discard is viable for rockfish fishing. But feasibility overall may depend on the amount of halibut in a given rockfish tow and other factors affecting sorting of catches and moving halibut across the vessel deck. Our research is designed to do sufficient testing to encounter varying amounts of halibut on a tow by tow basis and therefore provide us information on the challenges of discarding all halibut from a single point.

The outside portion of our PDC arrangement will have length markings on a set of strips placed on the vessel deck in the discard chute alley. The length markings should allow the length of each individual discarded halibut to be documented by the video cameras and then later determined through review of the video. Factors such as the speed at which halibut pass through this area, and orientation of the fish relative to the grid markings, and even the degree to which the fish are moving (flapping) may affect the feasibility of assessing lengths in this manner. Our experiment will vary the speed halibut are slid through the chute and the orientation of the halibut that are discarded on some trials in order to learn about the effects of these variables on the accuracy of the halibut length estimates.

Success in terms of completing the data collections without causing long delays between tows for the EFP vessel will depend on the number of halibut caught on each tow. Observer data for the rockfish fishery from 2003-2006 suggests that halibut catches for non-pelagic gear in the POP and other rockfish target fisheries are generally well under 2% of the catch. Assuming that EFP fishing resembles the observer data from the fishery over the last four years, the anticipated number of halibut per tow should be accommodated under the procedures.

Data Review and Analysis:
Video data collected during the EFP will be reviewed by a qualified contractor with experience collecting and reviewing video data for fishery monitoring. Once reviewers estimate lengths from the video images of halibut passing through the discard chute, weights will be derived from the length estimates based on standard IPHC “length to weight” conversion tables. Once the video is reviewed and extrapolations are made from samples collected by the sea samplers, weight estimates for each haul from each methodology (observer sampling and EM “census”) can be compared to the census of halibut discard weight per haul. For this assessment of the relative accuracy of the two

different methods for estimating halibut discards, managers and RPP cooperatives can evaluate different approaches to achieving the monitoring and catch estimation requirements for the fishery.

Analysis of the video data by a contractor hired for this purpose will also include the degree to which the protocol for discarding only halibut and discard at a single point is followed during the EFP. The EM provider contractor will also be responsible for providing estimates of halibut lengths for each halibut in each tow. For a random subset of the video data, the EM provider will use multiple independent reviewers for the same hauls to evaluate the degree to which reviewer characteristics affect the accuracy of length and count estimates. If reviewer characteristics appear to have a significant effect on estimated halibut lengths or other variables of interest, then a larger subset of the video data will be reviewed with multiple reviewers to further evaluate within-haul variance from reviewer characteristics. The EM contractor will also randomly and non-randomly sub-sample portions of the video data from some hauls to evaluate the effects of sub-sampling on the accuracy of estimates of halibut weight from EM. Non-random sub-sampling will utilize the vessel's logbook notations (time coded) of when halibut were discarded from individual hauls.

Once the length estimates are obtained from the EM provider, the EFP permit holder with the assistance of the AFSC will conduct an analysis of the relative accuracy of EM estimates of halibut discards on a haul by haul basis compared to the census. The same will be done with estimates of halibut discards from observer sampling. Further evaluation of the accuracy of estimates based on individual observer samples on individual tows as well as pooled observer samples from sets of tows during the same day or trip can be made to further evaluate the precision of observer sampling for halibut as part of the analysis. NMFS will oversee all aspects of data analysis by the EM contractor and EFP applicant.

An assessment of the feasibility of sorting and discarding only halibut and only at a single point will also be done. This analysis will be based on at-sea observations by the research crew and follow-up interviews with EFP project personnel who worked on the vessel during the EFP, sea samplers, and vessel crew and captain. The EFP applicant (or NMFS) will be responsible for conducting the interviews of EFP personnel and crews.

While not an explicit objective of this EFP, this research in combination with the 2005 EM pilot (see McElderry et al. 2005) and other information will be useful to understanding the practicality and accuracy tradeoffs in the context of the expected costs. The portion of the video review in the EFP that looks at the accuracy tradeoffs of reviewing EM data with more than one reviewer as well as sub-sampling of video data is expected to be especially germane to the cost and practicality assessment of EM video review for the monitoring objectives of the RPP.

Finally, the ability of crew members to remove all halibut catches prior to dumping the catch in the vessel's RSW tank will also be evaluated. This information is critical to the potential success of EM for monitoring rockfish fishing. The value of EM for the monitoring objective proposed for the RPP will be lower if vessels crews are not successful in sorting out a high fraction of the halibut for each tow. For this portion of the analysis, the highest degree of resolution of our analysis of the sorting efficiency of halibut will be at the trip level (instead of for individual hauls) because catch from different hauls during the EFP will be mixed in the RSW tank.

Sample Size Analysis

We requested that the Fishery Monitoring and Analysis Division of the Alaska Fishery Science Center evaluate the likelihood of detecting a difference between the estimated weight of halibut discard and the actual (census) weight. Power analyses were conducted based on two potential sources of data that were available for estimating the variances we might expect to see in the proposed study. These are the 2005 EM rockfish study (McElderry, 2005) for previous video sampling and for observer sampling the October 2005 Seafisher sampling density study (NMFS, unpublished data). Neither of these datasets is exactly pertinent to the study at hand in that they are not from comparable fisheries (to greater or lesser degrees). Additionally, the EM rockfish study was not designed to evaluate between-haul variance (catch between hauls was mixed so haul by haul video data cannot be compared to haul-specific halibut catch). Finally, the video data collected for the previous EM rockfish study used camera placements to observe the entire trawl deck area and discards occurred throughout this area. The variance associated with the specialized camera placements for the single point of discard in this study (PDC) could be rather different from the one estimated from the earlier study.

Observer Sampling Methods Sample Size Analysis

To assess the sample size (number of hauls) necessary to detect differences, the following power curve was generated (by NMFS staff) based on data from the 2005 Seafisher study. This earlier study was conducted in the Bering Sea in 2005 aboard the Seafisher, a 211 foot trawl catcher processor engaged in fishing for yellowfin sole (NMFS, unpublished data). Fishing was intentionally conducted to minimize the variance between hauls in the total catch weight and species composition of the harvest. The average percentage of halibut in the catch (by weight in the haul) was 0.64%. This is lower than we expect in the proposed study.

Both the within haul and between haul variances of the differences between known census amounts and estimates of halibut discard, based on observer sampling from the Seafisher study, were used in the analysis. The comparisons between census data and observer sample data were at the haul level.

The power function for the detecting percent differences in catch (relative to the true census amount) for $\alpha=0.05$ and 3 samples per haul is presented in the Figure below. The power curve is based on the assumption that the variances encountered in the Seafisher study are comparable to the ones we will see in this study. This may not be a valid assumption; however this was the best data available for this analysis.

Notice that with a sample of 30 hauls (the number of hauls we eventually selected for our study for the reasons outlined below), we have a 40% (approximate) probability of detecting a true 100% difference between the estimated and true halibut bycatch weight. The relevance of the variances (between and within haul) of halibut catch from a vessel targeting yellowfin sole in the Bering Sea to the current study is not known.

Overall, it seems that our expectation for having sufficient power to detect large differences is low given the anticipated small sample fractions expected under standard observer sampling methods for catcher vessels. This may be attributable to the fact that observer sampling procedures were designed to tell managers about catches across a fleet of boats over a weekly period, not tow by tow catches of relatively rare species such as halibut. Our evaluation of the precision of observer sampling through

comparisons to known amounts of halibut per tow will be informative nonetheless. It will provide data such that we can estimate the precision of estimates of halibut bycatch on a haul by haul basis for the small sampling fractions used by observers on most catcher vessels. Additionally, sample size requirements for both numbers of hauls and numbers of samples within hauls can be evaluated for this type of sampling. This will be useful for evaluating potential improvements to the observer sampling methods (sample collection) and catch estimation algorithms for vessel-specific catches. It will also demonstrate how EM compares to observer sampling and which provides a better overall estimate of halibut bycatch.

EM Sample Size Analysis

To assess how much fishing/sorting/ catch handling would be needed to thoroughly evaluate the utility of the EM, we eventually abandoned the formal power analysis approach for the evaluation of EM sample size in favor of a more intuitive approach. The data available for power analysis did not appear to be sufficient to provide meaningful inference. Variance estimates would have been used from two different datasets (Seafisher data for between haul variance and McElderry (2005) for between reviewer variance), neither of which was wholly applicable to the proposed study. Hence power analysis methods were not used and sample size analysis was based on assessment of anticipated study conditions and haul sizes.

First, we considered all the factors we thought were relevant to determining the accuracy of EM estimates of weight of halibut discards per haul. For both of these EM purposes, we decided that the most important factors were:

- Number of halibut in the haul and pace at which fish are moved through the PDC area;
- Degree to which the fish are moving (possibly flapping their tails) when they pass through the PDC area with the length strips on the deck ;
- Orientation of the halibut relative to the length strips (for length estimations);
- Number of halibut moving through the PDC simultaneously
- General light and sea conditions during the research

In recognition that our evaluation of EM would be affected by some or all of these factors (either individually or jointly), we adopted the following pragmatic approach to determining the amount of fishing and catch sorting needed to provide a thorough evaluation of EM for our purposes.

Our approach to estimating the amount of fishing/sorting/fish handling necessary for this experiment was designed around selecting an amount of rockfish fishing likely to encompass the desired range of study conditions. Our basic premise was that as long as the study lasted at least two weeks, we were likely to encounter a sufficient range of conditions (weather, lighting, *etc*.) to adequately assess catch estimation under realistic fishing situations. Overall, our goal was to fish during the study in a manner consistent with anticipated fishing behavior in the RPP.

In particular, we know that the refrigerated seawater tank capacity of a typical rockfish vessel is approximately 150,000 pounds of rockfish. This is less than the same vessel would hold in terms of pollock due to the packing and pumping (for offloading) characteristics of rockfish. We also believe that tows made during the RPP are likely to target approximately 30,000 lb of overall catch given that quality factors affect price

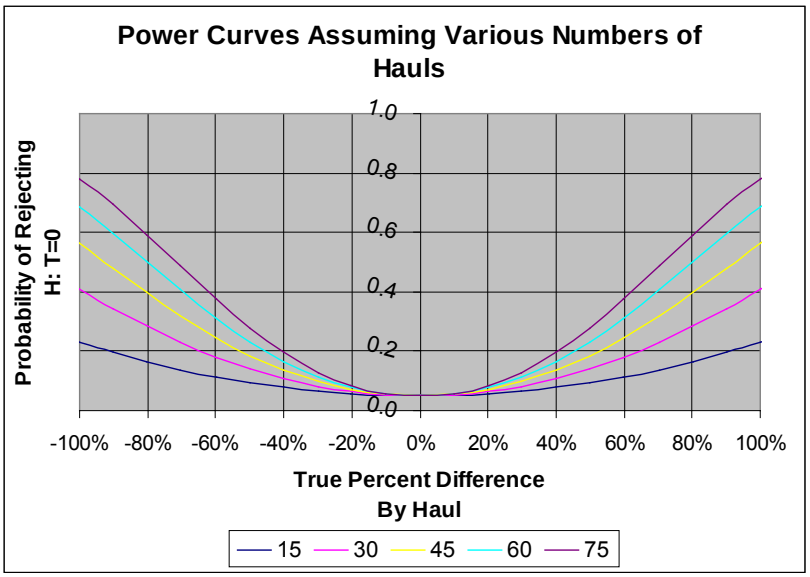
(tows larger than 30,000 lb would tend to bruise the fish). Hence, a rockfish trip will likely consist of 3-6 tows and will take approximately 2 – 3 days overall (one to one and one-half days of fishing plus travel to and from the plant).

On average, halibut catch per tow as a percentage of overall catch has been approximately 2% for non-pelagic gear during the 2003-2006 period (data obtained from Josh Keaton, NMFS Regional Office). But individual tows that target rockfish can catch higher fractions of halibut, sometimes up to approximately 6%.

During the fishing that will comprise 30 tows, we can expect a reasonable range of conditions in terms of the number of halibut that need to be sorted and discarded per tow (hence the pace of this sorting and moving halibut through the PDC), the degree of movement of the halibut as they are discarded (viability), the ambient conditions affecting fishing and sorting, and EM recognition of halibut discards. Some factors, such as the pace that halibut are pushed through the PDC, can obviously be varied artificially even if the number of halibut in a tow is relatively low. The preference, however, would be to do sufficient fishing for these factors to vary randomly, hence sorting, discarding, and sampling are conducted under as realistic a setting as possible.

Given the objective of testing our EM monitoring abilities under different conditions, it appears that 30 tows taken over 5-7 individual trips will provide a sufficient range of potential conditions to ensure that the study mimics the potential RPP fishing conditions.

The table above detailing the expected catch during the EFP is our best estimate of what we can expect to catch while making the 30 tows in the rockfish fishery. Of note here is that rockfish fishing has mostly occurred in July in the recent past and we will conduct our research sometime starting in mid-September through the end of October. While this may affect what is actually caught, the rockfish fishing that has occurred during times when the rockfish fishery has been re-opened in the fall suggests that our halibut catches will not be significantly different from those listed in the table below. The average halibut catch from October rockfish fishing has been 2.7% which is quite close to the 1.9% from the July rockfish fishery.



Anticipated impacts to endangered species or marine mammals
This EFP is expected to have little or no impact on marine mammals or other endangered species. All fishing activities are expected to take place outside of normal Stellar sea lion foraging areas and the majority of the fish harvested (Pacific Ocean Perch and rockfish) are of limited or no importance to marine mammals. Fishing under this EFP will take place outside of the normal fishing periods and will marginally increase the possibility of gear interactions with marine mammals. However, in comparison to the total amount of trawl fishing effort in the Central Gulf, this increase will represent considerably less than a one percent increase in the potential for marine mammal gear interactions. All fishing activities will be conducted in accordance with existing Stellar sea lion protective measures.

Responsibilities of different parties in this research Consistent with our current understanding regarding cost sharing, FMA (Observer Program) and NMFS Alaska Region will provide (in total) one project manager and one sea sampler for the field work. The EFP applicant will cover the cost of one sea sampler. The cost of the EM will be split equally between the applicant and (blank).

Reports and Dissemination of Study Results: The applicant will present the draft analysis and representative video segments to GOA fishermen in Kodiak at an informal workshop following the field work and development of a draft analysis is available. Additionally, applicant in conjunction with NMFS personnel involved with the project will present the draft findings of the study to the NPFMC and its advisory bodies at a Council meeting convenient to the Council. The applicant will also be responsible for providing the final EM EFP report to the interested public once that report has been reviewed by the Council and its advisory bodies.

Signature of Applicant: